Methods for Improvement of Listening Efficiency in Individuals With Visual Impairment

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FINAL REPORT OF PROJECT 83-R025.6

July 1, 1967—June 30, 1970

CLAUDELL S. STOCKER

Project Coordinator

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DIVISION OF SERVICES FOR THE BLIND
AND VISUALLY HANDICAPPED

Kansas State Department of Social Welfare

HARRY E. HAYES, *Director*

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AMERICAN FOUNDATION FOR THE BLIND
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ACKNOWLEDGMENTS

I would like to express my gratitude and appreciation to all the staff of the Kansas Rehabilitation Center for the Blind who contributed to the successful completion of this project. To Mr. Harry E. Hayes, Director of the Division of Services for the Blind and Visually Handicapped of Kansas, I cannot in any appropriate way put into words the full scope of what it means to work for an individual who encourages and allows his staff to so totally express their potential in the meaningful ways to which we all strive.

This project would probably have never reached its reality had it not been challenged and encouraged by Mr. Carl McCoy, former Supervisor of the Kansas Rehabilitation Center and now Director of the Florida Rehabilitation Center for the Blind. Mr. McCoy's deep intuitive feelings toward the rehabilitation process were always an encouragement to the staff to explore and develop new ideas and not to be afraid to change the old ways.

Mr. Lowell Holland, present Supervisor of the Kansas Rehabilitation Center, came early to the listening project and quickly picked up enthusiasm that was already generating. His efficient administrative direction of this project was always an encouragement.

No amount of money coud possibly compensate nor recognize the interest, encouragement, and consistent services given to us by two such dedicated men as Dr. Ralph Nichols, of the University of Minnesota, and Dr. Howard V. Williams, Jr., former psychiatric consultant to our Center and presently Director of State Community Mental Health Service of Kansas.

Dr. Nichols' pioneer work and findings in the area of listening education contributed much to our initial research. Dr. Nichols' objective reviews and opinions of this project have been of constant value since its beginning. Dr. Williams gave much of his valuable time to reviewing with the project coordinator, the validity of our learning theories. He also very graciously gave time to just "listening" to the many frustrations that we have faced.

We wish to thank Mrs. Sylvia Buckner and her staff of the Topeka State Hospital Clinical Library for their help during the research period and allowing us to use their facilities. Appreciation is expressed to the staff of the Clinical Library of the Menninger Foundation for their contribution to the research part of the project.

We wish to express appreciation to Dr. Jerry Dunham and his staff of the Northwestern Regional Rehabilitation Center for the Blind of Seattle, Washington, for their cooperation in supplying the project with a test sample to be considered in our comparative study. To Mr. Otto Turner, Supervisor of social and psychological services and his staff of the Rehabilitation Center for the Blind of the Arkansas Enterprises for the Blind at Little Rock, Arkansas, we are greatly indebted for their many hours work involved in providing us with a large test sample to conclude our comparative study.

We were indeed fortunate to have had the services of Miss Betty Girling. Miss Girling was so enthused about this program that she gave close to one thousand hours to the Center staff and one year of her time during the pre-project study in compiling a teacher's manual of listening lessons. Later, after the initiation of the project, she became one of the staff consultants but all the pre-study was done fee-free.

CLAUDELL S. STOCKER,
Project Coordinator.

INTRODUCTION

History and Background

This innovation project, "*Methods for Improvement of Listening Efficiency in Individuals with Visual Impairment*, evolved out of discussions, planning conferences, and research that started as early as 1963 under the guidance and leadership of Mr. Carl McCoy former Supervisor of the Kansas Rehabilitation Center for the Blind. Many facts and truths began to emerge that made us aware of the importance of listening to the total person. Two-thirds of any human being's waking life is spent in listening. To the general public poor interpretation of what has been heard causes more mistakes and accidents and slows down more industries than any other one factor. However, the area of listening education, and its formal training, has long been neglected. Science has proven that one hears with the ear but listens with the brain. This can be compared to the fact that one sees with the eye but visually reads with the brain. One does not have to be taught to see but he does have to be taught to visually interpret the written word through the brain. One does not need formal education to hear but he does need education in properly and correctly interpreting what he has heard. New ideas and techniques are often greeted with suspicion and even ridicule. Louis Braille was laughed at when he prepared the first braille alphabet and not even during his lifetime was this method of communication formally accepted in his own land. However, today, braille is a method of reading for the blind that is universally accepted and is unquestioned as a part of a blind person's rehabilitation program. Although for centuries blind people have "pecked" around with a cane, it was not until World War II that Dr. Richard Hoover, now famous ophthalmologist, began to develop scientific and organized instruction in preparing the blind person to use the long white cane as an effective and safe means of mobility. At that time there was much skepticism. However, today, no rehabilitation center would be without a good mobility and orientation department.

It has long been recognized in the area of rehabilitation for the blind that the level of listening efficiency is probably the one most important sensory modality that the blinded person has left. A person can be taught the motor skill of the correct use of the white

cane and still be a very poor traveler. It is again his level of listening efficiency that makes or breaks his ability to safely travel about independently. A blind person may have an excellent sense of touch and a good kinesthetic memory, but if he cannot properly interpret words and sounds, he cannot efficiently learn to follow new directions in learning new skills, trades, and in functioning in the classroom or even the efficient care of his daily needs. There is not one area of instruction in the Rehabilitation Center for the Blind that is not highly affected by one's level of listening efficiency.

Recognizing listening education as being such a vital factor to the rehabilitation of the blind and actually so neglected, we decided with the encouragement of our consultants and workers for the blind from other agencies, to begin serious and formal work to develop classroom curriculum.

Numerous individuals and institutions throughout the country had already done past research and development of material in teaching listening to the sighted. One of the most important groups working in this area were faculty members of the University of Minnesota. We found that these people were most eager to help us in our research and in completing the teacher's manual of curriculum even before we made application for the innovation grant.

Miss Betty Girling, Director of the Minnesota School of the Air, gave many hours in preparing the first teacher's manual. Dr. Ralph Nichols, long pioneer in the area of listening education, and Dr. James Brown, expert in the area of listening and reading education, have previously developed class materials and test instruments to prove the advantages of listening education. Dr. Brown was the co-developer of a test instrument kown as the Brown-Carlson Listening Comprehension Test which comes in two forms and can be administered before and after a person has participated in listening classes. Dr. Nichols has developed much classroom curriculum that is used in listening classes at the University of Minnesota. It had been their experience as well as that from other institutions that if a sighted person participated in the listening classes, he can improve his listening efficiency on the average of 12 percent. Their work was mainly aimed at listening comprehension and recall of classroom material.

Although we investigated and researched many other listening projects, we felt these people had more to offer us in our undertaking than most others.

On July 1, 1967, the Kansas State Department of Social Welfare, Division of Services for the Blind and Visually Handicapped was

awarded an Innovation Grant, Project No. 83-R025.6, by the Department of Health, Education and Welfare, Rehabilitation Services Administration. The grant was used with matching funds from Division of Services for the Blind to initiate a project entitled, *"Methods for Improvement of Listening Efficiency in Individuals with Visual Impairment."* The three year project was used to develop curriculum to teach the skill of listening in rehabilitation centers for the blind and terminated June 30, 1970.

Purpose and Goals of the Project

(A) To explore and develop new methods and techniques for training persons with serious visual impairment to listen with greater efficiency.

(B) To develop and organize curriculum and instructional materials for a formalized course in listening education.

(C) To prove the effectiveness of an organized program for improvement of listening efficiency.

(D) To further prove the usefulness of objective measures of listening comprehension and retention.

(E) To demonstrate the value of listening education as an addition to the training already offered at the Kansas Rehabilitation Center for the Blind.

(F) To make available to other organizations and facilities a set of printed and recorded materials for instructional use in improvement of listening efficiency, by submitting same to a commercial publishing house for publication and distribution.

Review of Literature and Resource Material

The previously stated purposes and objectives of the project were developed from a review of past research and programs relating to listening education. Although many reviews, papers, and longer articles were read, we feel the following made major contributions in developing our program: *Are You Listening?* by Dr. Ralph G. Nichols; *The Improvement of Listening Comprehension in Partially Sighted Students*, a dissertation by Dr. Robert William Bischoff; *Listening; Reading* by Sam Duker; *The Art of Listening* by Dominick A. Barbara.* Many, many shorter articles and papers contributing to our thinking are to be found in *Listening Bibliography* by Sam Duker and from *Psychological Abstracts.*

* See bibliography for complete references.

The Setting

The Kansas Rehabilitation Center for the Blind, of the Division of Services for the Blind and Visually Handicapped, of the State Department of Social Welfare is located in Topeka, Kansas. This Center offers a comprehensive training program that assists individuals to gain compensatory skills which will facilitate their adjustment to blindness. Emphasis is also placed on pre-vocational training and evaluation of employment potential. The program also includes a ten week summer operation aimed at preparing students for college entrance. Activity areas, into which the training is organized, include Orientation and Mobility, Techniques of Daily Living, Communication Skills and Manual Arts. Each client during the first few weeks of his stay receives thorough psychological evaluation and psychiatric interviews. The current admission policy is to accept a new group of trainees every six weeks. The size of each group ranges from six to eight clients in number and each trainee remains at the Center for an average of 17 weeks. The total capacity of the Center is 24 clients. The professional staff includes the Supervisor, one Social Worker-Counselor, three Orientation and Mobility Instructors, one Manual Arts Instructor, one Techniques of Daily Living Instructor, two Communication Instructors, one consulting psychologist and one Psychiatric Consultant. Local medical facilities are used when the need arises. The Center has a residential facility with one full-time and one part-time dormitory director and a housekeeping staff.

Project Staff

The project staff consists of the following: project director, project coordinator-instructor, assistant instructor and secretary.

Mr. Lowell E. Holland, Supervisor of the Kansas Rehabilitation Center for the Blind, served as project director. Mr. Holland has been employed by the Kansas Division of Services for the Blind and Visually Handicapped since 1958. Seven of these years he served as a vocational rehabilitation counselor and since 1965, as Supervisor in the Rehabilitation Center. He has a Bachelor of Arts Degree in Social Science, a Master of Education Degree in Educational Guidance and a University Graduate Certificate in Rehabilitation Counseling.

The project was coordinated by Mrs. Claudell S. Stocker, Coordinator of the Communications Department in the Kansas Rehabilitation Center for the Blind whose position included instruction in the listening classes and developing curriculum. Mrs.

Stocker has a Bachelor's Degree in Psychology with 10½ years experience with the Kansas Division of Services for the Blind and Visually Handicapped. Prior to this, her work, of eight years, was in the area of special education with mentally retarded and brain injured children.

Mrs. Mary Lou Stark, Communications Instructor in the Kansas Center, served as assistant instructor to the listening classes. Mrs. Stark has a Bachelor of Education Degree and is certified to teach by the Kansas State Department of Education.

Harold T. Ginsparg, Ph. D., consulting Psychologist to the Kansas Rehabilitation Center for the Blind, served as statistician and advisor to the project coordinator. Dr. Ginsparg has 11 years experience in the area of work with the blind.

Miss Betty Girling served as curriculum consultant. Miss Girling is associate professor of the General Extension Division and Director of the Minnesota School of the Air of the University of Minnesota. Miss Girling has a Bachelor of Arts Degree in Speech, Bachelor of Science Degree in Education, Master of Science Degree in Curriculum and Instruction in Education and is working toward her Ph. D. in Education and Communication.

Mr. Frank Oppitz, Jr., sound engineer of Central Recording Studios of Topeka, Kansas, served as project sound engineer.

METHODOLOGY

Program Description

Each group of clients entering the Center was enrolled in the listening course in addition to other Center activities. Each group remained together in the listening class throughout their Center experience. As previously described, groups of clients are received into the Center program at six week intervals, remaining in the program approximately 17 weeks. Twelve weeks after the initiation of the project, three classes were in operation at all times at different levels of instruction. Each class received 50 minutes of instruction three times per week on Monday, Wednesday, and Friday. Some trainees terminate prior to the 17 week plan and some remain longer than 17 weeks. Only those people who participated at least 10 weeks in the listening project were included in the statistical data. Those remaining longer than 17 weeks in the total Center program were terminated from the listening classes. Prior to the beginning of the project, July 1, 1967, much research material had been gathered and an outlined teacher's manual had been written. From July 1, 1967 to December 22, 1967, pilot classes were conducted in order to refine the prepared material to a point where we felt it would be appropriate to begin formal instruction with each subject being pre- and post-tested.

At the end of the first year of the project, the project coordinator and the curriculum consultant reviewed the teacher's manual which consisted of set lesson plans for each hour and revised the curriculum into a more flexible arrangement. By the end of the first year, we eliminated some material originally prepared and began work on new material we felt would be more appropriate for our goals. At that time we prepared an outline of goals for the final curriculum development which remained the same throughout the project. The outlined manual material is divided into three phases of instruction:

PHASE I. *Pre-skills or Listening Readiness Program.* This includes:

(A) Discrimination of likeness and differences of sounds; number, word sequences, and nonverbal sounds.

(B) Unlearning rote listening: eliminating retention of irrelevant words and nonverbal sounds.

(C) Use of other sensory modalities in listening and retention.

1. Investment of total self
2. Discrimination of "emotional filters" *

This is attained through use of music, nonverbal sounds, informational paragraphs with emotional content, work and task drills, and stories. Much time was also spent in this phase in introducing the person to the use of mental imagery in remembering what has been heard and toward better organization of sounds. A great deal of attention was paid in helping the individual discover his own emotional filters and how he may avoid or successfully cope with same.

It would seem that, initially, the greatest task a teacher has to perform is to bring the class to the realization of what they do not "hear." In the first teacher's manual we had started listening exercises, "for the improvement of listening efficiency," during the first hour. We soon discovered that people were taking these exercises as being rather immature and childlike and they were investing very little in same. We discovered that most people came into the classes with the attitude that they did not need a listening class as they had been listening all their lives. Most people in our culture have been conditioned to rote learning and, therefore, listening was approached in the same way. We quickly discovered that the old ways of didactic teaching did not work, particularly, toward changing these attitudes. We found that immediately the "emotional filter" had already displayed a damaging effect in these early classes. Therefore, we had to rewrite our lesson plans, for this first phase, into a "getting ready to learn" process. We continued to use some of the initial verbal and nonverbal exercises pertaining to likeness and differences in sound but approached these in more rapid form to show the individual how much he did not pick up in ordinary listening situations. For instance, rapid sequences of numbers would be "fired" at the student asking him to immediately recognize the sound that he heard twice; example, 74802431. The student has to unlearn listening to a "number" as he is listening for pure sound. He is not given time to repeat the sequence of numbers to himself but has to learn to pick out the likeness of the sounds through a combination of feelings rather than the intellect alone. Exercises relating to likeness and differences

* The term "emotional filter," as used here and throughout the report, is described by Dr. Ralph Nichols in his book *Are You Listening?*: ". . . our emotions act as filters to what we hear. At times they, in effect, cause deafness, and at other times they make listening altogether too easy. When our emotions overstimulate our brain, it becomes more difficult to listen effectively; meanwhile important things may be spoken that will never be repeated for us. Emotional filters are at work to affect nearly everything we hear." Dr. Nichols believes, and we agreed after experiencing same in the classroom, that one can discover his own "emotional filters" and is, therefor, able to learn to satisfactorily cope with them.

within a series of words were presented: tomorrow, today, *tight,* tonight, together, toward. He must very quickly identify the word that sounds different from the others. No series was ever repeated by the instructor. If the student misses, they continue to the next series. Groups of nonverbal but similar sounds were presented on tapes. For instance; four bells with similar sounds and one buzzer. The client had to identify where in the series was the different sound. This also was done in rapid order without repeating a particular series.

From "likeness and differences" we began to present series of words where four of the words would have something in common and one would be from a different idea. The student was then asked to begin to use some mental or visual imagery in picking out the word that did not fit. For instance; hat, coat, boots, *apple,* gloves. These were also presented rapidly without repetition.

Exercises with words and nonverbal sounds from tapes were rapidly presented to the individual for a rapid immediate response. This initially causes frustration and the student rationalizes reasons for his mistakes. They would initially complain that the exercises were repeated too fast, they did not have time to think; however, quite soon the person began to recognize that this was a deficit in his attention span and tendency to avoid the responsibility of quickly organizing his own thoughts and most of all to help the individual to recognize his own responsibility in learning to listen. Many began recognizing, as is common in our society today, that we have a tendency to "jump at conclusions" or not "follow through with our thinking." This can cause many personal, as well as vocational, problems. From working with pure sounds, verbal and nonverbal, we advance to exercises pertaining to rapid organizing of words to form a complete logical idea. For example, the student was asked to reorganize in probable sequence four words from a general idea that were presented to him. For instance; plant, soil, vegetable, seed which the student should as quickly as possible reorganize into the sequence of soil, seed, plant, vegetable. Nonverbal sounds from tapes were also used. For instance, the sound of the opening of a car door, getting into the car, fastening the safety belts, installing the key in the ignition and starting the motor.

Here we also begin to use "mental imagery" to help remember rather than relying on rote learning. Stress was placed on the use of all our sensory modalities and the feelings that result from same, rather than making each task an intellectual one. For those people

who were adventitiously blind much emphasis is placed on the use of visual imagery. For those who were congenitally blind, we quickly reached the fact that although there is no visual imagery there is much "mental imagery" relating to many words and phrases. At this point recorded musical melodies from the "Grand Canyon Suite" were presented to the group asking them to relax and allow their fantasies and imaginations to move with the music. After listening to the music, each person was to relate in words any fantasies that he had experienced during the music. Although many kinds of "stories" come from pieces such as the "Cloud Burst" sequence, all of their stories do coincide with peace, fear, danger, salvation and returning to peace again. These fantasies developed from the effect of listening to the music being experienced through other senses. For example; feeling cold, warmth, pleasure, the smell of new rain, the feeling of cold weather and the fear or pleasure brought on by each. Along with this nonverbal presentation, exaggerated short paragraphs were presented to the group and they were told to repeat the story in their own words. They were again asked to relax and to "feel" the words as they came through rather than trying to rotely remember the story. Example: "In January, Jim started for Jamaica in an outrigger canoe with a crimson sail, and a life boat tied behind, which was full of beer cans and pretzels." One can readily see how such exaggerated material can possibly activate the total self in attempting immediate recall.

As previously stated, Phase I of this listening instruction series is meant as an awareness period and we soon discovered that it must be vivid and very exaggerated to accomplish the task. Mental imagery, emotional filters, tuning in and following through becomes integral within this first phase of listening. All the exercises including the taped sequences are very exaggerated and then through group discussion we were able to make analogies to our daily communication of listening. The individual quickly discovers that listening is not just hearing through the ear but the total self must be involved if one is to retain and best use his full potential. All of the exercises are followed up with group discussions concerning how we had immediately felt during the hour. It is during this first phase of the listening program that the individual begins to recognize his own inadequacies and discovers his poorest and best listening habits. The general group begins to realize that much inability in immediate recall and in permanent retention is due to the fact that he tries to remember everything he has heard rather

than tuning in to the main ideas and eliminating the irrelevant sounds around him. Some of this is directly related to methods used in teaching rapid reading. We had initially tried, through lectures, to explain *these very principles* to the class but it did not work. *Only through the group experience* were the individuals able to gain insight into their own responsibility in this form of communication. Whenever the groups reach this point of thought, we are then ready to go into Phase II of the listening program. We found that generally Phase I lasts about six weeks.

PHASE II. *Development of Listening Skills.*

(A) Learning to tune in to instructions, general speech, and nonverbal sounds in preparation for the detailed listening process.

(B) Recognizing transitions or re-tuning in with cue words, phrases and familiar sounds.

(C) Developing the recognition of concluding phrases of the listening process.

(D) Further development of mental imagery and pictures as a cue to better organized listening.

(E) Learning to reorient to the mental picture through verbal, nonverbal and other sensory cues.

(F) Recognizing and learning better control of personal emotional filters.

During Phase II we find the individual is more anxious concerning his "disorganized listening" and he becomes more motivated to learn more efficient methods of listening. He has more insight for reasons for tuning in, questioning, listening for material and more eagerness to review to retain same. During this phase, we begin to put together previously singled out contributors to good and poor listening. All the parts of the "previous puzzle" begin to fit together to form a total picture. We try to accomplish this now by presenting lessons "in the whole." Also, the individual now has tuned himself in to investing himself into the dynamics of the class. Here we find the great benefit of teaching this skill in a group rather than on an individual basis. We find that the listener can very often control the attitude of a whole group and influence the presentation of a single speaker. We discover the vast importance of the place of verbal and nonverbal identified sounds in our ability to be an organized individual. We discover the importance of being able to verbalize what one has heard into the permanent listening pattern. We discover also that merely listening and rotely "parroting" what we have heard does not mean that we have learned. By this time the group is well ori-

ented to the physical surroundings of the Center setting and is able to very adequately move about from place to place in comparable comfort. But, does this mean that this particular mobility skill will be carried over into a new environment? One of the prominent parts of this phase of the listening course makes one wonder. In one set of listening lessons each person is asked to choose and give directions to an unidentified spot of the Center setting or the surrounding grounds. The group is to properly identify the destination from the student's directions. It was amazing to the instructor and other group members at some of the places the individual's instructions would take us. Then the instructor would switch the process and give verbal instructions as to how to reach an unidentified point in the Center setting, and from these directions the group had to determine where we had gone. Again, various members of the group would end up in various parts of the Center. Is it any wonder then that blind people find it very difficult at times to ask questions of strangers in public places and public buildings and are then unable to arrive at the correct destination? Of course, sometimes poor directions are given, but we think most of the time it is that the individual cannot take responsibility in reorganizing confused directions into their proper sequences. After the initial "shock" of these lessons, we began in an organized, almost didactic way, to help the individual tune out unnecessary verbal and nonverbal sounds and to reorganize in proper sequence garbled directions. Here mental imagery is of the utmost importance in recalling and being able to immediately use same. Along with the verbal instructions we began to use nonverbal sounds and cues in an environment where verbal help is impossible. For instance, in our own Center we taped all the sounds from the front door through the building and classrooms to the very back of the physical setting. Each person created his own mental imagery as related to these sounds, in essence, we painted a mental picture. After the total "sound" story was presented various sound clues were presented out of sequence and the person was to identify where he would be, at that point, in his surroundings. We expanded these tape sequences through airports, bus stations, the dentist office, etc. Each time the "sound" stories were followed up with various clue sounds taken out of sequence in order that the person might reorient himself to exactly where he would be in that particular environment if he became confused and had to reorient himself through sound clues alone.

We also spent some time in listening to emotional laden material

in order to learn to listen through the lines and to make character and personality judgments. Again there was much group discussion as to how our own personal emotional filters can cause us to react positively or negatively to any given situation. At the end of this phase each individual again evaluates, with the instructor, his own insight as to his poorest or best listening habits.

PHASE III. *Development of recall and retention through the techniques of review.*

This is accomplished through more detailed organization and use of previously learned skills of Phase I and II; longer and more detailed materials of directions, news stories, informational paragraphs, speeches, music, personal conversation and nonverbal sequences of sounds on tape that form a pattern, story or orientation to time and space.

During this period, taped sequences from radio, television newscasts, commercials, etc., are used for testing out immediate recall. Listening retention is tested out through follow up testing after readings of 10 to 15 minute short stories. For example, many of these stories were taken from Readers Digest and are read only once to the group. They are given at least five follow up tests over a period of two weeks to see how much of the original material has been retained. In all of these longer and more detailed sequences of listening, the individual constantly reviews, as a whole, what he has just heard. He reviews the general ideas, puts these together to form a whole, which allows pertinent facts to emerge from the total.

Note: It is of particular interest to note that when 10 weeks of the listening material was presented to our college preparatory summer group they constantly came out taking better notes from classroom lectures; so it is my feeling that the organized listener has far less difficulty in taking good notes in the classroom.

Data Collection

The collection of data on all clients was the responsibility of the project coordinator. All data used in final statistics came from the client population of the Kansas Rehabilitation Center for the Blind and the Rehabilitation Center of the Arkansas Enterprises for the Blind, Little Rock, Arkansas. A project case file was kept on each case. Each file contains the following:

(A) A personal data sheet containing age, sex, visual acuity, age of onset of blindness, verbal IQ score, cause of blindness, number of weeks participating in a Center program and school grade level completed.

(B) Wide Range Vocabulary Test Form B.[1]

(C) Brown-Carlson Listening Comprehension Test Form AM and Form BM.[2]

(D) Daily progress notes completed by the instructor relating to the progress of the individual.

The Brown-Carlson Listening Comprehension Test was constructed to measure the ability of students to comprehend the spoken language. There are two comparable test forms, AM and BM, each containing 76 test items. These items are grouped into five parts, each an important listening skill. The time required for administration of each test is approximately one hour. The test was administered orally and recorded by the examiner from the responses of the clients. During the first week of the client's entrance into the Center program, he was administered the Wide Range Vocabulary Achievement Test to establish his achieved grade level. He was then administered Form AM of the Brown-Carlson test before entering the formal listening classes. The same procedure was followed for the Rehabilitation Center in Little Rock, Arkansas, before the client's entrance into a Center program that did not offer formal listening classes. The Wide Range Vocabulary Test was administered to establish the achieved grade level in order that the Brown-Carlson could be scored. We felt that since a Rehabilitation Center for the Blind client population ranged so widely in age and actual grade level completed that we needed to establish a current functional achievement level. In the Kansas Center just before the client's termination or at the completion of 17 weeks of listening instruction the Brown-Carlson Form BM was administered. In the Arkansas Center the same test instrument was administered to the client upon his termination from that Center. In the Kansas Center data was collected on 76 clients. In the final statistics five subjects were eliminated for various reasons. (Further explanation of eliminations will be found in the section entitled *Results.*) The Arkansas Center provided 31 subjects for consideration with the final use of 29.

Client Population

Seventy-six people participated in the Topeka project. Of these 76, five were eliminated for various reasons in the final statistics (see conclusions). The client population ranged in age from 16 to 68. Thirty were in the 16 to 25 age range, 12 in the 26 to 35 age range, seven in the 36 to 45 age range and 22 in the 46 to 68 age range. There were 27 females and 44 males. Visual acuity ranged from 15 clients who were totally blind and 56 who had

light perception or better. Onset of blindness occurred in 25 at birth and 46 were adventitiously blind. IQ ranges were from 75 to 133 as measured on the verbal section of the Wechsler Adult Intelligence Scale with the majority in the average range. Educational achievement level as measured by the Wide Range Vocabulary Test ranged from ninth year third month to college freshman. The majority of the population were citizens of Kansas with 17 coming from out of state. Most clients had been referred to the Center by vocational rehabilitation counselors; however, there were a number of referrals from home teachers for general rehabilitation and adjustment services. All participated in the total Center program, and with the exception of only a few, all were residents in the Center dormitory facilities during their training. The subjects used in this project were in the Center program for at least ten weeks. A few remained in the Center program after they were terminated from the listening training at the end of 17 weeks.

Thirty-one subjects from the Little Rock samples were used with two being eliminated in the final statistics. Age range of this group was from 18 to 57. Eighteen clients were in the age range from 18 to 25, eight were 26 to 35, one was in the 36 to 45 age range with two falling in the 46 to 57 age range. There were 17 females and 12 males. Academic achievement level, as measured by the Wide Range Vocabulary Test, ranged from the ninth year third month to college freshman. Onset of blindness ranged from 13 people being congenitally blind and 16 being adventitiously blind. There were six totally blind individuals with 23 having light perception or better. IQ scores, as measured by the verbal section of the Wechsler Adult Intelligence Scale, ranged from 87 to 135. The Little Rock Rehabilitation Center is a Center aimed at general rehabilitation as well as vocational rehabilitation and accepts clients from many other states besides Arkansas.

The two Centers are similar in structure and program content with the exception of formalized listening instruction.

RESULTS AND CONCLUSIONS

The primary purpose of this project was to develop classroom curriculum that could improve listening efficiency of blind adults. This curriculum was to be designed and used in the classrooms in the Kansas Rehabilitation Center for the Blind. After careful consideration of various test instruments designed to measure listening efficiency with the sighted, we chose the Brown-Carlson Listening Comprehension Test to measure the progress or lack of progress of each individual. As previously described, this test comes in two equivalent forms. During the first year of the program, each person in the Kansas Center was administered the AM form of the Brown-Carlson before formal participation in the listening classes, and the BM form was administered at his termination or at the end of 17 weeks participation in the listening program. During this first year the average range percentile gain from pre- to post-testing of the total group was 17.45 percent. Recognizing that this score was measuring the total person and his total participation in the rehabilitation program, we felt that it would be helpful to secure a test sample from another rehabilitation center with a similar training program that did not include formal listening classes as part of their curriculum. During the second year of the project the Northwestern Rehabilitation Center for the Blind in Seattle, Washington, furnished us with a small sample of pre- and post-tests which indicated a 16 percent gain. During this same second year, the Kansas Center participants showed an average rise of 19.3 percent. The Seattle Center was unable to furnish us with further samples during the third year. The Rehabilitation Center for the Blind in Little Rock Arkansas, of the Arkansas Enterprises for the Blind, agreed to furnish a larger sample during the third year of the project. At the end of the third year we were able to use 29 of the Arkansas Tests for comparison with the 71 subjects from the total Kansas sample. The total percentile gain of the Arkansas group showed a 12 percent gain from the pre-testing to the post-testing. The total sample of 71 subjects from the Kansas group showed an allover gain of 19 percent.

Statistical Results

In trying to complete final statistical results it was decided to only use the Little Rock sample as it was larger than the Seattle

sample and we felt it would be unwise to mix testing from both Centers.

It is hypothesized that both the experimental (Topeka) group and the control (Little Rock) group would be drawn from the same population of clients attending similar Center programs. To test for bias, the mean standard score obtained from the AM form of the Brown-Carlson Listening Comprehension Test from both groups given at the initial stage of center training would be compared. The assumption was made that zero (null) difference would occur. This was sustained by the data, the statistics are as follows:

Topeka = 71	Mean = 104.9154	S. D. = 12.2145
Little Rock = 29	Mean = 104.4827	S. D. = 10.4827
	D = 0.4327	
	t = 0.1655	p = N. Sig.

To determine if sex or age of the clients might present a bias, the data was analyzed using a 2×2 and 2×5 analysis of variance adjusted for unequal number of subjects for treatment. It should be noted that by inspection that from an age range point of view the experimental and control groups were not equivalent. The majority of the control group ranged in age from 17 to 35, and both sexes were represented. However, at the older age levels both sexes were not represented. This restricted the analysis of the data to two age levels. For the two analysis of variance problems the overall effect of age alone or sex of client alone suggests that one could expect no significant differences between the Difference Score Means on sex or the five levels of age (or two levels in the case of the control group). However, for the experimental group there is a trend for the specific effect of sex and age for example, at the 26 to 35 age range the female clients show a higher mean Difference Score than their male counterparts at that age range, etc.

The experimental group findings show a significant F-ratio for the interaction of sex and age which is at the .001 level of significance. The results suggest that at the 17 to 25 age range the males have a higher mean difference score while in the 26 to 35 age range the females have the advantage.

The lack of comparability on age in the first place and a trend toward differences between groups as a function of the interaction of age and sex, results in an imposition of limitations on the findings and limits generalization.

Allover Statistical Findings

1. As a major function of the statistical study was to test whether a specific training program would improve listening scores on the Brown-Carlson Listening Comprehension Test, the BM form of the Brown-Carlson Listening Comprehension Test was administered at the end of the training period for both groups. The resulting pre-post difference score in standard score units was adjusted for negative values by adding a constant. It was hypothesized that the difference between the means of the experimental and control group would be a significant difference to the experimental group's advantage *i. e.*, the null hypothesis (no difference) would be rejected. On the contrary the null hypothesis was sustained.

2. Due to the limitations imposed on the results by a bias in sampling the control group might not have given an adequate point of contrast and *does not negate the value of training.*

The following is a statistical comparison of the congenitally and the adventitiously blind within each sample group and a comparison between the two groups.

Summary
Congenital Blind—38
Comparison—Topeka versus Arkansas
N = 25 = 13

High and Low Difference Scores
Brown-Carlson (AM-BM)
Statistic Used = Chi Square

Median = 30

Chi Square = 1.052

Probability = Two tailed test
Not significant

	Topeka	Arkansas	
High	14	5	19
Low	11	8	19
	25	13	38

Interpretation: No difference between the groups

Adventitiously Blind = 62
Comparison—Topeka versus Arkansas
= 46 = 16

Statistic Used

Median = 31

Chi Square = 5.433

Probability = Two tailed test at the .02 level

	Topeka	Arkansas	
High	17	1	18
Low	29	15	44
	46	16	62

Interpretation: Topeka Adventitiously Blind scored higher than Arkansas Adventitiously Blind possibly demonstrating that with training Topeka group gained more

Summary
Topeka—Congenital Blind N = 25
Comparison—Total Blind versus Partially Sighted
N = 6 = 19

High and Low Difference Scores
Brown-Carlson (AM-BM)

Statistic Used

Median = 31

Chi Square = 1.79

Probability = Two tailed test Not significant

	Total	Partial	
High	5	10	15
Low	1	9	10
	6	19	25

Interpretation: No Difference

Topeka
Adventitiously Blind N = 46
Comparison—Total Blind versus Partial Sight
N = 9 = 37

Statistic Used

Median = 27

Chi Square = 2.939

Probability = Not significant

	Total	Partial	
High	7	17	24
Low	2	20	22
	9	37	46

Interpretation: No Difference

Arkansas
Adventitiously Blind = 16
Comparison—Total Blind versus Partial Sight
N = 2 = 14

Statistic Used—Fisher's Exact Function

Probability = One tailed test

Function at .05

level

	Total	Partial	
Low	1	1	2
High	6	8	14
	7	9	16

Interpretation: Total Adventitiously Blind scored higher than the partial Adventitiously Blind, again showing greatest gain. This is in contrast to Topeka where difference did not occur.

Congenital Blind

Sample too small for statistical comparison.

Observations and Possible Trends Within the Topeka Group

As previously stated the primary purpose of this project was *not* in the area of research and comparison but to *develop listening curriculum* to be used in the Kansas Rehabilitation Center for the Blind. Therefore, our primary concern is comparing the pre- and

the post-test scores within the Kansas group to determine the development of listening efficiency within this one particular group.

As reported in the section on client population it will be noted that the data gathered on the group showed a wide coverage of age, sex, IQ, educational level, visual acuity, and onset of blindness. Taking a look at their percentile differences from the Brown-Carlson AM pre-testing and the BM post-testing, we might establish an estimation of listening efficiency within most rehabilitation center populations and possible gains with listening training.

As previously stated, there were 71 subjects in the Topeka sample. In comparing their pre- and post-testing percentile scores, we find a mean difference of 19 percent.

SEX

Within the total sample there were 44 males and 27 females. The males showed a percentile gain from pre- to post-testing of 19 percent. The females showed an average gain of 20 percent.

AGE

Within the age range of 16 to 25 there were 30 people. These 30 subjects showed an average gain of 20 percent from the pre- to the post-testing. There were 12 people between the age range of 26 through 35. The average gain in this range was 11 percent. There were seven subjects within the 36 to 45 age range. Of this group there was a 15 percent allover gain from the pre- to the post-testing. In the 46 to 68 age range there were 22 people. *The total group showed an average gain of 25 percent in their listening efficiency.*

ONSET OF BLINDNESS

Twenty-five of the subjects were congenitally blind. In this group there was a 24 percent allover gain in listening efficiency from the pre- to the post-testing. There were 46 adventitiously blind subjects. Of this group there was a 17 percent allover gain.

TOTAL GAIN OF CONGENITALLY TOTAL BLIND VS. ADVENTITIOUSLY TOTAL BLIND

In the sample there were six congenitally total blind subjects and nine adventitiously total blind subjects. The congenitally total blind samples showed an allover gain of 29 percent from the pre- to the post-testing and the adventitiously total blind showed a total gain of 20 percent. The pre-test scores of the congenitally total blind subjects were considerably lower than the pre-test scores of the adventitiously total blind.

In the pre-test the congenitally total blind individuals showed a listening efficiency of 25 percent or less. This group of individuals seem to be less organized in their listening ability than had been thought in the past.

We could possibly draw from this that the congenitally total blind individual does not have as high listening efficiency as we had assumed before. We could also assume that a combination of a listening and a rehabilitation program can greatly improve this group's listening efficiency.

However, this group is also the group that is showing the greatest amount of gain in the post-test period. There seems to be some correlation between their disorganized listening and their poor ability to physically orient to their environment.

OBSERVATIONS

It is interesting to note, though, in past projects related to listening, that were conducted with sighted individuals, the people who scored the lowest on performance tests were also the poorest listeners. Could this be, then, that organized listening does have a definite influence on one's ability to better orient to physical surroundings? Could this also mean that organized listening does improve the use of kinesthetic sense? Could the post-test results also indicate that for one to become a better organized listener he is better able to cope with his physical surroundings? We feel that in the future a study done comparing performance test to listening scores with an experimental and control group could prove valuable in the area of work for the blind.

Results of interest to note is that the known underachiever is also showing a standard score on the Brown-Carlson pre-test that is somewhat lower than his IQ potential. In each one of these instances general center staff evaluation of their total rehabilitation progress seems to agree with the individual's standard test scores. It would seem, that perhaps in the future, the Brown-Carlson Listening Comprehension Test might be another valuable tool to validate an individual's total rehabilitation progress.

Looking at the entire picture of the test samples, it is quite obvious that those individuals regardless of visual acuity who score lowest on the pre-test are making the widest range of gain on the post-test. Those people who score in the superior range of listening, initially, do not show significant differences in the post-test. This correlates with Dr. Ralph Nichols' findings with his college freshmen at the University of Minnesota.

During the entire three years on the project, while observing the entire group and working with the participants on an individual basis, it was observed that, without doubt, the greatest inhibitor to better listening efficiency is the emotional filter. Regardless of the test scores and training in the various areas of listening, emotional filters, whether positive or negative, can be an immediate influence of listening efficiency at any one moment. Some emotional filters are so instantaneous and traumatic that they can never be controlled. However, there are old set patterns that we are individually faced with, if recognized, can be watched for, identified and we can better learn to cope with these. This was constantly observed with many individuals and those who were able to retain this insight did become better listeners. Therefore, it is our feeling that realizing that one listens with the total self rather than just the ear and the brain must be recognized and dealt with on an individual basis while teaching listening as well as any other training offered to the human being. This is sound learning theory as particularly recognized by Dr. John Dollard* and our project consultant, Dr. Howard Williams.

During the entire project the Center staff acted as consultants to the classes and gave positive feedback as to the influence this particular new program was having on the attitudes of their clients. This alone demonstrated a value of listening education as an addition to our regular training program. Organized curriculum and instructional materials have been compiled with teacher's manuals and will be submitted for publication, distribution and use for those centers and schools interested in listening programs.

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APPENDICES

TOPEKA

TOPEKA

Name	Age	Sex	Ach. Level	Weeks Part.	AM–BM Score	AM–BM Diff.	Diag.	Onset	Vis. Acu.	Stand. Score B–C, AM–BM Diff.	IQ
01.	57	F	CF	14½	54–80	+26	Diabetic retinopathy with cataracts	54	LP	104–114	128
02.	29	M	CF	13	68–80	+12	Juvenile glaucoma bilaterally	Birth	Partial Sight	104–114	105
03.	40	M	11.8	13	71–80	+9	Bilateral optic atrophy	39	LP	110–114	98
04.	43	F	CF	13½	99–99	0	Detached retinas bilaterally	18	Total	120–138	124
05.	19	M	CF	17	99–99	0	Optic atrophy secondary to trauma	19	Total	132–132	115
06.	20	M	10.8	16	2–10	+8	Retrolental fibroplasia	Birth	Total	75–85	95
07.	51	M	9.3	10	78–90	+12	Glaucoma	45	Partial Sight	113–120	108
08.	56	F	CF	13	42–51	+9	Optic atrophy secondary to brain tumor surgery	15	Partial Sight	100–103	116
09.	25	F	CF	16	7–51	+44	Primary retinal degeneration	2	Total	82–103	100
010.	49	F	CF	16½	37–60	+23	Retinitis pigmentosa	39	LP	98–106	107
011.	42	M	CF	16½	51–53	+2	Diabetic retinopathy	41	Partial Sight	103–106	112

012.	49	F	12.8	17	80–68	−12	Retinal hemorrhages	47	Partial Sight	114–109	106
013.	19	M	11	10½	45–85	+40	Amblyopia, high myopia, nystagmus	Birth	Partial Sight	101–117	108
014.	23	M	CF	14	54–90	+36	Retinal aplasia secondary nystagmus	Birth	Partial Sight	104–120	111
015.	51	M	10	14	16–42	+26	Retinitis pigmentosa	50	Partial Sight	89–100	87
016.	17	M	CF	10	92–96	+4	Optic atrophy with undetermined etiology	Birth	Partial Sight	122–127	126
017.	18	F	CF	10	51–94	+43	Retrolental fibroplasia	Birth	Total	103–124	116
018.	17	M	CF	10	71–90	+19	Cataracts	Birth	Partial Sight	110–120	125
019.	17	M	CF	10	80–98	+18	Nystagmus and albinism	Birth	Partial Sight	114–130	133
020.	18	F	CF	10	68–93	+25	Cataracts and retrolental fibroplasia	Birth	Total	109–122	114
022.	24	M	CF	10	91–80	−11	Diabetic retinopathy	22	Partial Sight	120–114	114
024.	16	F	CF	10	83–71	−12	Hereditary congenital optic atrophy	Birth	Partial Sight	116–110	117
025.	49	M	10.3	17	32–4	−28	Retinitis pigmentosa, high myopia, cataracts	10	Partial Sight	97–79	92

TOPEKA—*Continued*

Name	Age	Sex	Ach. Level	Weeks Part.	AM–BM Score	AM–BM Diff.	Diag.	Onset	Vis. Acu.	Stand. Score B-C, AM-BM Diff.	IQ
026.	20	M	10.3	17	54–83	+29	Amblyopia, optic atrophy, myopia, estropia	Birth	LP	93–116	106
027.	19	F	11.3	17	13–45	+32	Congenital cataracts retinal detachment	Birth	LP	87–101	103
028.	29	F	12.8	10	20–48	+28	High myopia	Birth	Partial Sight	91–102	100
029.	18	F	CF	17	75–96	+21	Optic Atrophy	Birth	LP	112–127	Bright Normal
030.	20	M	10.3	10	49–82	+33	Albinism with nystagmus	Birth	Partial Sight	119–115	Aver-age
031.	50	M	11.8	17	8–71	+63	Optic atrophy	50	Total	83–110	118
032.	22	M	11.8	17	27–57	+30	Retrolental fibroplasia	Birth	Total	94–105	97
033.	38	M	11.3	12	7–5	−2	Retinal degeneration	8	LP	82–80	90
034.	32	M	9.3	10	20–62	+42	Intra-ocular hemorrhages	32	Total	91–107	75
035.	31	F	12.8	17	80–99	+19	Congenital glaucoma	6 mo.	Total	114–133	123
036.	20	M	9.3	17	68–95	+27	Retrolental fibroplasia	Birth	Total	109–125	98
037.	39	F	CF	17	54–92	+38	Congenital glaucoma	Birth	Total	104–122	124

038.	26	M	CF	17	54–51	−3	Diabetic retinopathy retinal hemorrhages	24	R: LP L: CF 6′	104–103	113
039.	21	F	CF	17	95–95	0	Central scotoma and retrobulbar neuritis	19	Partial Sight	125–125	121
040.	60	F	11.3	17	16–45	+29	Glaucoma	42	Partial Sight	89–101	95
041.	56	F	10.3	17	27–83	+56	Diabetic retinopathy	54	Partial Sight	94–116	100
042.	28	M	10.3	17	83–97	+14	Bilateral amaurosis	28	Total	116–129	108
043.	28	M	CF	13	95–96	+1	Diabetic retinopathy, glaucoma left eye	14	Partial Sight	125–126	122
044.	47	M	CF	17	20–98	+78	Nystagmus with retinal changes	Birth	LP	91–130	110
045.	31	M	11.3	11	83–98	+15	Cataracts, amblyopia, retinal detachment	8	R: 20/200 L: Total	116–131	121
046.	55	F	10.3	13	35–57	+22	Diabetic retinopathy	51	R: Motion Per. L: None	97–105	97
047.	41	M	11.3	14	16–48	+32	Retrobulbar neuritis with optic atrophy	41	FC in each eye	89–102	94
048.	26	M	9.3	17	32–51	+19	Advanced diabetic retinopathy	25	LP	96–103	86
049.	33	F	9.3	17	24–16	−8	Optic atrophy with undetermined etiology	32	FC: 2′	93–89	91

TOPEKA—*Continued*

Name	Age	Sex	Ach. Level	Weeks Part.	AM–BM Score	AM–BM Diff.	Diag.	Onset	Vis. Acu.	Stand. Score B–C, AM–BM Diff.	IQ
050.	18	M	CF	15	90–90	0	Retinal detachment	16	R: LP L: Hand Motion	120–120	132
051.	26	M	9.3	16	65–68	+3	R: LP L: enucleated	25	LP	108–108	98
052.	17	F	CF	10	95–99	+4	R: Myopia astigmatism L: Aphakia	Birth	R: 20/25 L: 3/200	125–132	125
053.	18	M	CF	10	37–68	+31	Retinal Fibroplasia	5	20/25 with glasses	98–132	113
054.	18	F	CF	10	86–99	+13	Retrolental fibroplasia	5	Total	118–134	116
055.	18	F	CF	10	90–94	+4	Retrolental fibroplasia, nystagmus	Birth	R: 20/200 L: None	120–124	119
056.	19	M	CF	10	54–90	+36	Congenital bilateral cataracts	Birth	R: 20/200 L: 20/200	104–120	115
057.	17	M	CF	10	60–90	+30	Optic atrophy both eyes	Birth	R: 20/200 L: 20/200	106–120	123
058.	17	F	CF	10	12–37	+25	Optic atrophy	7	R: 20/400 L: 20/400	86–98	108

060.	61	M	CF	17	51–71	+20	Macular degeneration	59	CF: 6′ bilaterally	103–110	120
061.	54	F	CF	17	95–96	+1	Cataract surgery and retinal separation	R: 51 L: 49	L: Total R: LP	125–127	126
062.	20	M	12.8	16	60–98	+38	Diabetic retinopathy in R. Glaucoma in Left.	R: 19 L: 20	FC in R. L: 20/60	106–131	103
063.	21	M	9.3	17	71–92	+21	Retrolental fibroplasia	Birth	LP & Projection	110–122	101
064.	42	M	CF	16	62–95	+33	Diabetes with secondary glaucoma	39	R: 20/200 L: Removed	107–125	119
065.	47	M	10.3	17	51–78	+27	Glaucoma, diabetic retinopathy	46	R: None L: LP	103–113	101
066.	52	M	CF	4	80–80	0	Retinitis pigmentosa with cataracts	49	20/200 in either eye	114–114	126
067.	26	M	CF	13	83–71	−12	Severed optic nerves secondary to fractures of bones of orbit	25	Total	116–110	114
068.	55	F	CF	12	22–71	+49	Chorioretinitis	50	20/400 Both eyes	92–110	101
069.	56	M	11.8	17	18–71	+53	Retinal detachments	54	R: Total L: FC 4′	90–110	110
070.	24	M	9.3	10	78–99+	+21	Retinal problem due to chloroquine therapy	9	R: CF 6′ L: 20/80	113–135	118

TOPEKA—*Concluded*

Name	Age	Sex	Ach. Level	Weeks Part.	AM–BM Score	AM–BM Diff.	Diag.	Onset	Vis. Acu.	Stand. Score B–C, AM–BM Diff.	IQ
071.	46	F	9.3	15	48–88	+40	Pigmentation due to chorioretinitis	6	Hand Movement	102–119	96
072.	47	M	CF	17	68–80	+12	Left: Bilateral uveitis, pupil-ectomy, R: cataract	45	R: 5/200 L: 20/400	109–114	120
073.	47	M	CF	11.3	60–62	+2	Retinitis pigmentosa	Birth	R: HM 14″ L: 20/400	106–107	140
074.	68	F	CF	13	45–90	+45	Retinal degeneration	67	L: CF R: CF	101–120	128

TOPEKA

Case Number	%ile Difference AM-BM
01	+26
02	+12
03	+ 9
04	0
05	0
06	+ 8
07	+12
08	+ 9
09	+44
010	+23
011	+ 2
012	—12
013	+40
014	+36
015	+26
016	+ 4
017	+43
018	+19
019	+18
020	+25
022	—11
024	—12
025	—28
026	+29
027	+32
028	+28
029	+21
030	+33
031	+63
032	+30
033	— 2
034	+42
035	+19
036	+27
037	+38
038	— 3
039	0
040	+29
041	+56
042	+14
043	+ 1
044	+78
045	+15
046	+22
047	+32
048	+19
049	— 8
050	0
051	+ 3
052	+ 4
053	+31
054	+13
055	+ 4
056	+36
057	+30
058	+25
060	+20
061	+ 1
062	+38
063	+21
064	+33
065	+27
066	0
067	—12
068	+49
069	+53
070	+21
071	+40
072	+12
073	+ 2
074	+45

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